



CH2MHILL

CH2M HILL
135 South 84th Street
Suite 325
Milwaukee, WI 53214-1456
Tel 414.272.2426
Fax 414.272.4408

November 18, 2003

184256.RA.01

EPA Region 5 Records Ctr.



362883

Mr. Dion Novak
Remedial Project Manager (SR-6J)
U.S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd
Chicago, IL 60604-3590

Subject: WA No. 219-RSBD-B5Y7, Contract No. 68-W6-0025
Eagle Zinc Site, Hillsboro, Illinois
Review Comments on Preliminary Information on Human Health and Screening
Level Ecological Risk Assessment

Dear Dion:

As requested, we have reviewed ENVIRON's Human Health and Screening Level Ecological Risk Assessment information. CH2M HILL's comments on the information is provided in the attached technical memorandum.

We hope that the comments and recommendations are helpful. Please call us if you have any questions regarding the attached document.

Sincerely,

CH2M HILL

for Chris English, P.E.
Site Manager

STL\Risk Assessment Cover Letter.doc

c: Stephen Nathan, PO/U.S. EPA Region 5 (w/o enclosure)
Marshall McReynolds, CO/U.S. EPA Region 5 (w/o enclosure)
Ike Johnson, PM/CH2M HILL, MKE
Dan Plomb, DPM/CH2M HILL, MKE
Lauri Gorton, QAM/CH2M HILL, MKE
Cathy Barnett, CH2M HILL, STL
Cherie Wilson/CH2M HILL, MKE

Review Comments

Preliminary Information on Human Health and Screening Level Ecological Risk Assessment Eagle Zinc Company Site, Hillsboro, Illinois

PREPARED FOR: Dion Novak/USEPA Region 5

PREPARED BY: CH2M HILL

DATE: November 18, 2003

CH2M HILL has reviewed the material referenced above, submitted by ENVIRON International Corporation (ENVIRON) to the U.S. Environmental Protection Agency (USEPA) on November 3, 2003. The information provides ENVIRON's proposed methodologies and preliminary information that will be used to conduct a human health and screening level ecological risk assessment for the Eagle Zinc Company Site.

Review comments on the human health and screening level ecological risk assessment information are presented below.

Human Health Risk Assessment

Based on our review of the human health risk assessment (HHRA) information, we are providing the following comments and recommendations regarding HHRA content and approach for this site.

General Comments

The use of Tiered Approach to Corrective Action Objectives (TACO) should provide useable risk assessment information to the extent that the authors of the HHRA keep in mind certain expectations, including: 1) making sure that a transparent process is used in moving from the universe of chemicals, affected media, pathways and receptors at this site to those that are the drivers of site risks; 2) making sure that reasonable maximum exposure scenarios (as defined by Risk Assessment Guidance for Superfund [RAGS]) are clearly presented in order to support risk management for the site; and 3) making sure that reasonable assumptions and methods are used in developing exposure point concentrations. While there are not any real obstacles created from using TACO, the authors of the HHRA should bear in mind that there are not any real benefits from the process either, and should have sufficient flexibility to deviate from the prescribed tiered process when it makes sense to achieve the overall expectations of a transparent process and clearly-presented results.

Section 4, Selection of Chemicals of Potential Concern

According to the HHRA information, the following criteria will be used to select Chemicals of Potential Concern (COPCs) at the site:

- detection in 5 percent of samples
- positive detection in at least one sample above the maximum background level

Further discussion will be required in the risk assessment report to explain how these selection criteria assure that all potential risk drivers have been identified correctly. The guidance used to define these criteria should be cited. Screening against TACO Tier I values should not follow “screening” based on process knowledge, frequency of detection or background, but should be done concurrently. Prior to excluding chemicals based on lack of detection in a media, the detection limits should be compared with TACO Tier I values to verify that they were adequate to detect risk-based levels. Chemicals with detection limits higher than risk-based concentrations should not be excluded at this point in the risk assessment. Chemicals both in on- and off-site media should be screened against TACO Tier I values for residential land use for COPC selection.

A clear process description should be provided in the risk assessment showing how the COPCs shown in Table 1 were developed from the target analyte list for the site, and what factors were considered for inclusion or exclusion of each chemical on the target analyte list. Summary statistics should be developed for each media showing total numbers of samples, numbers with detected concentrations, minimum and maximum detected concentrations, and minimum and maximum detection limits, for all target analytes, in order to define the starting point for the COPC selection process. In facilitating that process, it might be useful to provide a brief discussion regarding the original data quality objectives for the investigation – it might be easier to rule out chemicals on the target analyte list as COPCs if there is some understanding as to why they were being analyzed in the first place.

Section 5, Exposure Assessment

While there are no intrinsic concerns with presentation of exposure and risk descriptors based on parameters developed using maximum likelihood estimation (MLE) methods, the expectation is that a reasonable maximum exposure (RME) scenario developed in accordance with RAGS should be clearly presented in the risk assessment. In developing parameters using MLE methods, the authors of the HHRA are encouraged to show how all pertinent data were used in parameter development, why the estimated parameters are robust (i.e., why they are representative of the underlying distribution of the data), and how they provide unbiased estimates of parameter values. The authors are encouraged to develop multiple descriptors of exposure and risk only where these are valuable for characterizing health risks; for example, multiple descriptors should be required only for those scenarios where the RME scenario both shows risks beyond the health-protective range and is characterized by substantial uncertainty.

The author’s assertion that “[b]ecause the Site’s current and historical use is industrial and current zoning does not permit residential development, the assumption that future land use at the Site will be industrial is considered valid. Accordingly, the most appropriate on-Site exposure scenario is the commercial/industrial worker”, is not an adequate basis for evaluating remedy selection for future land use. It is questionable that there should be constraints on land use during the risk assessment portion of the remedial response process, and land use restrictions should be evaluated as part of the Feasibility Study (FS). Therefore, the authors of the HHRA need to make sure that an on-site residential exposure

scenario be included as part of the future land use scenarios evaluated in the risk assessment.

Additional detail should be provided in the risk assessment regarding how data will be presented and evaluated for purposes of estimating exposure point concentrations. The description presented in this approach does not provide adequate detail regarding how distribution testing will be conducted, and does not provide any hierarchy of how various methods available for estimating summary statistics and confidence limits will be applied to the data sets. Description of how the data are grouped into exposure units should be provided in the risk assessment to provide an understanding of how the exposure point concentrations are being applied to specific areas.

Section 6, Toxicity Assessment

Adjustments to toxicity values (cancer slope factors or Reference Doses) to be consistent with exposure assumptions should be applied and evaluated as uncertainties, and not applied to the RME scenarios. "Full documentation" of these adjustments in the risk assessment, as stated in the approach document, implies that estimated risks with adjusted and non-adjusted toxicity values will be presented side-by-side.

Section 7, Risk Characterization

The progression of chemicals and media from Tiers 1 to 2 to 3 should be presented clearly, showing which chemicals and media "drop out" at a tier, and describing clearly the nature of assumptions (generic, limited site-specific, fully site-specific) used at each tier.

Screening Level Ecological Risk Assessment

The screening level ecological risk assessment (SLERA) approach, prepared by ENVIRON's subcontractor, Limno-Tech, Inc. (Limno-Tech), was reviewed to determine if the assumptions and approach are appropriate to indicate the potential for ecological risk at the site. Because limited details are presented, a detailed review of the SLERA approach presented is not possible. Key recommendations are to follow a single guidance (preferably USEPA, 1997), evaluate on-site terrestrial receptors, and to allow review of assessment endpoints, measurement endpoints, exposure parameters and ecotoxicity values.

General Comments

The guidance documents followed (USEPA, 1997; ASTM, 2002) are appropriate for a SLERA. However, the extent to which these guidance documents will be followed (format, structure, etc.) is not clear. Because most of the examples and the structure presented in the SLERA approach are from the USEPA (1997), the suggestion is to follow only this guidance. This will allow sufficient clarity in the presentation of the results and will increase the efficiency of the review process.

The impact of physical disturbances on ecological receptors is indicated as a significant stressor at the site. Differentiating chemical and physical stressors at the site will be an important step in the risk management process. For the benthic community, sample locations downstream of sediment inputs may have both physical and chemical impacts.

CH2M HILL agrees that other stressors, particularly physical stressors, should be considered at the site. However, conservative assumptions should be employed for a SLERA and assessment endpoints with complete exposure pathways should be evaluated for chemical stressors. Specifically, the benthic community and terrestrial receptors should be considered impacted from chemical stressors without other site-specific assumptions.

Specific Comments

Screening Level Problem Formulation and Ecological Effects Evaluation. Limno-Tech should provide screening ecotoxicity values (NOAELs and LOAELs) and exposure parameters compiled for wading birds and piscivorous mammals for review. Sources for these values are not mentioned in the information provided by Limno-Tech, but should be reviewed to ensure appropriateness.

Page 2; Paragraph 2. Limno-Tech should provide assessment and measurement endpoints for review to ensure appropriateness. Our suggestion is to also include a list of all terrestrial and aquatic receptors on the site, as well as an expanded description of the terrestrial and aquatic habitats.

Page 2; Paragraph 4. An evaluation of on-site terrestrial receptors is recommended. The Checklist (Attachment A) notes several terrestrial receptors observed during the site visit, and indications are that up to 70 percent of the site (approximately 90 acres) is not covered with buildings (as little as 10 percent covered by buildings) or site features (as little as 20 percent covered by site features). Because adverse effects were also observed, the suggestion is to evaluate terrestrial receptors if a complete exposure pathway exists. Although the future use is expected to be industrial/commercial, some portions are expected to remain undeveloped, and conservative assumptions should be made for future land-use. Note also that ecotoxicity values and exposure parameters for terrestrial receptors should be provided for review. Tissue uptake and bioaccumulation from soil should also be added to the Conceptual Site Model.

Page 3; Paragraph 2. We recommend that chronic exposure surface water screening ecotoxicity values (Illinois WQC and USEPA) and Lowest Effect Levels (LELs) from Persaud et al. (1993) are used for the SLERA because of the necessary conservative assumptions.

Page 3; Paragraph 5. Note that bioaccumulation factors are appropriate and recommended for estimating dietary exposure to higher trophic levels if measured tissue concentrations are not available.

Page 4; Paragraph 2. Correct to "An HQ more than 1.0 suggests that the chemical may present....".

Page 4; Paragraph 3. Because the level of organization evaluated is an important consideration for a SLERA, the SLERA should provide a definition of the community-level of effects to be evaluated. A community- or population-level of assessment should be clearly defined, as this level of assessment may include an evaluation of site-specific assumptions, such as a spatial evaluation or a refinement of contaminants of concern, which is not appropriate for a SLERA. Refining contaminants of concern by evaluating frequency and magnitude of detection, background concentrations, or dietary considerations should be

reserved for a baseline ERA. The intention of a SLERA is to provide an indication of the potential for ecological risk, and to focus efforts for further evaluation, if necessary.

Checklist (Attachment A). This checklist should provide a further description of the adverse impacts to trees observed in the northern part of the site.

Conceptual Site Model (Attachment B). Surface water ingestion should be included as a complete exposure pathway for wading birds and piscivorous mammals in the Conceptual Site Model (Attachment B).

Conceptual Site Model (Attachment B). Further clarification should be provided on the "Land Use" column, or it should be removed. It is not clear if all relevant receptors considered have habitat on-site. "Habitat requirements consistent with current or future uses" for terrestrial receptors is not consistent with the main text (page 2; para 4). Note also that the current use, and potential future use, on the large portion of the site is undeveloped, and provides habitat for terrestrial receptors.

Data Concerns (From Comments on Remedial Investigation Phase 2 Technical Memorandum)

Conditions during the surface water sampling events have not been adequately described. Specifically, those related to precipitation, flow rates, surface water levels, and general chemistry of the surface water. These conditions provide an indication of the representativeness of the sample results that will be utilized in the SLERA. We recommend providing an indication of how representativeness of the data and data gaps will be evaluated.

Where possible, dissolved and total concentrations should be determined and reported in ecological risk assessments. Surface water results are reported in the Remedial Investigation Phase 2 Technical Memorandum as total concentrations only. Many aquatic toxicity benchmarks are based on dissolved concentrations in water. As a consequence, use of unfiltered samples may over-represent concentrations, resulting in overestimation of exposure and risk to aquatic biota (water column invertebrates, plants, fish, and amphibians). Total concentrations are preferred for risk evaluation of higher level trophic organisms. Please indicate if dissolved or total concentrations will be used in the SLERA.

Conclusion

Because limited details are presented, a detailed review of the SLERA approach is not possible. Key recommendations are to follow a single guidance (preferably USEPA, 1997), evaluate on-site terrestrial receptors, and to allow review of assessment endpoints, measurement endpoints, exposure parameters and ecotoxicity values. Data concerns from the Phase 2 Remedial Investigation should also be addressed.

References

ASTM, 2002. Standard Guide for Risk-Based Corrective Action for Protection of Ecological Resources. Designation: E2205-02. West Conshohocken, PA.

USEPA, 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. Solid Waste and Emergency Response. EPA 540-R-97-006.